

QC77/
A7 pr
no. 225P

US-CE-C

Property of the United States Government

PNE-225P

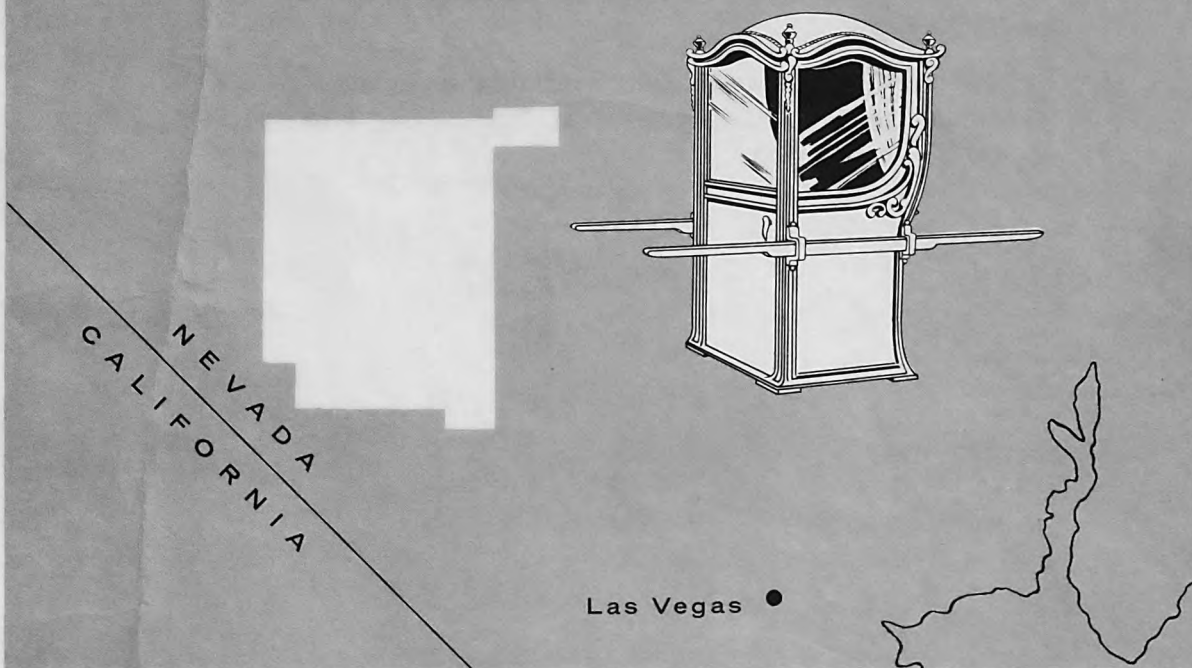
PRELIMINARY REPORT

Plowshare / peaceful uses for nuclear explosives

UNITED STATES ATOMIC ENERGY COMMISSION / PLOWSHARE PROGRAM

project SEDAN

NEVADA TEST SITE / JULY 6, 1962



Part 1. Characteristics of Fallout from a Deeply Buried Nuclear Detonation from about 3 to 150 Miles from Ground Zero

Part 2. Aerial Radiometric Survey

RESEARCH CENTER LIBRARY
US ARMY ENGINEER WATERWAYS EXPERIMENT STATION
VICKSBURG, MISSISSIPPI

Part 1. K. H. Larson / B. W. Kowalewsky / R. A. Wood / H. M. Mork / D. Paglia

Part 2. R. B. Guillou / Staff of ARMS I (USGS) and ARMS II (EG&G)

UCLA SCHOOL OF MEDICINE

ISSUED: MAY 17, 1963

Digitized by Google

NUCLEAR EXPLOSIONS - PEACEFUL APPLICATIONS

PROJECT SEDAN

PNE-225P

PART I. CHARACTERISTICS OF FALLOUT FROM A DEEPLY BURIED
NUCLEAR DETONATION FROM ABOUT 3 TO 150 MILES
FROM GROUND ZERO

PART II. AERIAL RADIOMETRIC SURVEY

PART I:

K. H. Larson, Project Officer, Project 62.86
B. W. Kowalewsky
R. A. Wood
H. M. Mork
D. Paglia

PART II:

R. B. Guillou, Project Officer, Project 62.80
and the staff of
ARMS I (USGS) and ARMS II (EG&G)

Laboratory of Nuclear Medicine & Radiation Biology
School of Medicine
University of California
Los Angeles 24, California

August 1962

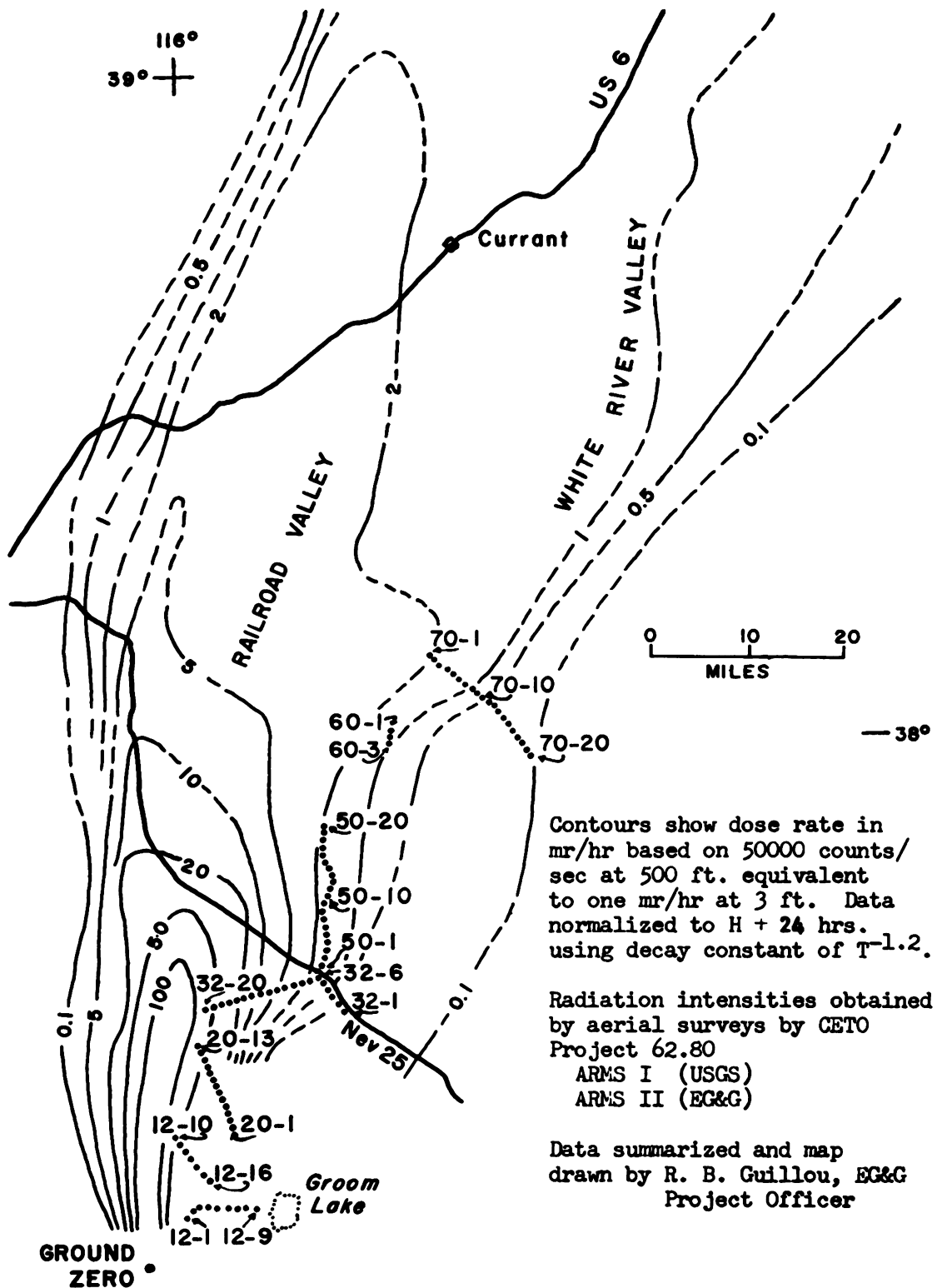


FIGURE 2.1 PRELIMINARY MAP OF RADIATION INTENSITY CONTOURS AND THE LOCATION OF OFF-SITE FALLOUT SAMPLING STATIONS, SHOT SEDAN

TABLE 3.1 TOTAL NUMBER OF FALLOUT SAMPLING STATIONS
ESTABLISHED AND CONTAMINATED, SHOT SEDAN

Arc	Region	Station Interval	GC	GITR	TOAD	No. Contam- inated
mi from GZ		mi				
12		1.0	16	3	4	12
20		1.0	13	3	5	13
32		1.0	20	4	5	16
50		1.0	20	4	5	16
60		1.0	3	1	1	3
70		1.0	<u>20</u>	<u>4</u>	<u>5</u>	<u>14</u>
Totals:			92	19	25	74

TABLE 3.2 WIND STRUCTURE FORECAST FOR
0900 HRS. PDT, 6 JULY 1962, AND AS DETERMINED AT 1013 HRS. PDT
BY RADAR SOUNDINGS AT LOCATION BJY, YUCCA FLAT, SHOT SEDAN

(Readings Given as Bearing of Origin and Speed)

Altitude	Forecast	Observed
ft above MSL	degrees/knots	degrees/knots
20,000	230/25	—
19,000*	—	250/06
18,000	220/25	220/06
17,000	—	200/06
16,000	220/20	180/16
15,000	—	190/13
14,000	210/20	190/17
13,000	—	190/33
12,000	215/15	200/26
11,000	—	200/20
10,000	200/15	210/16
9,000	200/15	220/13
8,000	200/15	210/11
7,000**	200/15	200/09
6,000	190/10	170/09
5,000	190/10	150/10
Surface: 4317	180/08	160/10

* Estimated Top of Cloud

** Elevation of Oak Spring Butte, about 4 miles North of GZ

TABLE 3.3 FALLOUT TIME OF ARRIVAL MEASURED BY TOAD AND GITR UNITS

(Station Number in Parentheses, See Figure 2.1 for Location Along Fallout Pattern)

Arc No.	Time-of-Arrival-Detector (TOAD) Readings	Gamma Intensity Recorder (GITR) Readings
approx. miles from GZ	H + ____ hrs.	H + ____ hrs.
12	(6) NDR* (8) NDR (10) NDR (12) 0.67	(1) 0.36 (4) IM** (14) IM
20	(1) 7.58 (3) 9.20 (7) 0.85 (11) 1.08 (13) IM	(5) 1.08 (9) 0.97 (12) 1.00
32	(5) NDR (7) 2.33 (11) 2.17 (14) 2.50 (16) 1.50	(6) NDR (8) 5.23 (10) NDR (15) 1.43
50	(3) IM (8) NDR (12) NDR (17) NDR (20) NDR	(2) NDR (5) NDR (10) NDR (15) 2.50
60	(1) 3.02	(3) 2.90
70	(1) 3.45 (5) 1.92 (10) 2.50 (14) NDR (20) NDR	(3) 3.30 (8) IM (13) NDR (18) NDR

* NDR = Radiation less than 2 mr/hr, the lower limited of TOAD's.

** Instrument malfunction

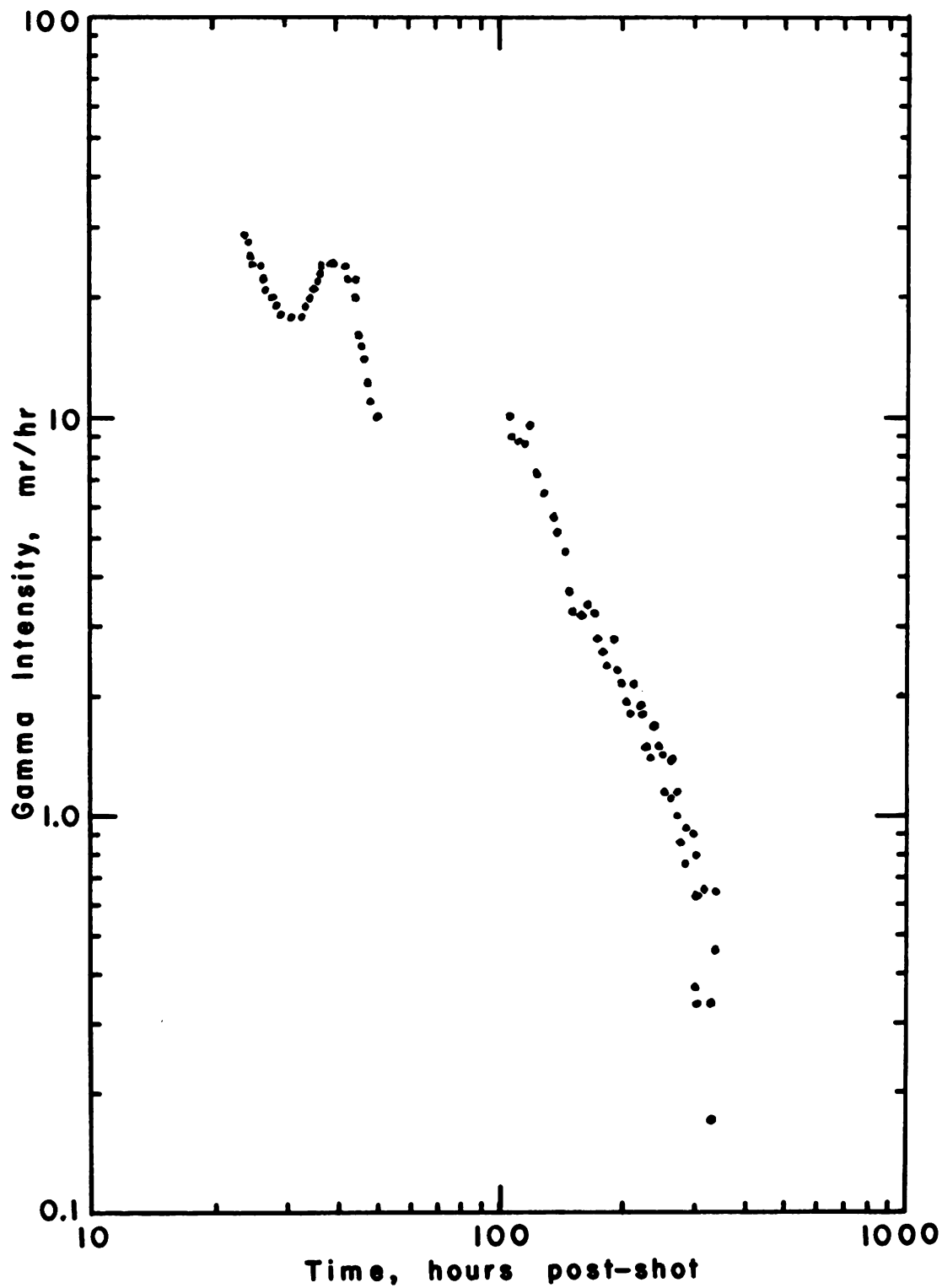


FIGURE 3.1 DECAY CURVE FROM D + 1 DAY TO D + 15 DAYS
OBTAINED FROM GITR AT STATION 14, ARC 12, SHOT SEDAN

TABLE 3.4 MAXIMUM GAMMA-RADIATION INTENSITIES
DETERMINED BY GROUND MONITORING ALONG ASSIGNED ARCS

Arc	Station No.	Maximum Corrected Reading	Time of Reading	Corrected Gamma Intensity, H+12 hrs
mi		mr/hr	H + hrs	mr/hr
12	10	>500	8	>310
20	12	102.5	14	124
35	16	41.3	13	45
50	20	1.28	14	1.6
60	1	1.9	12	1.9
70	3	1.02	13	1.1

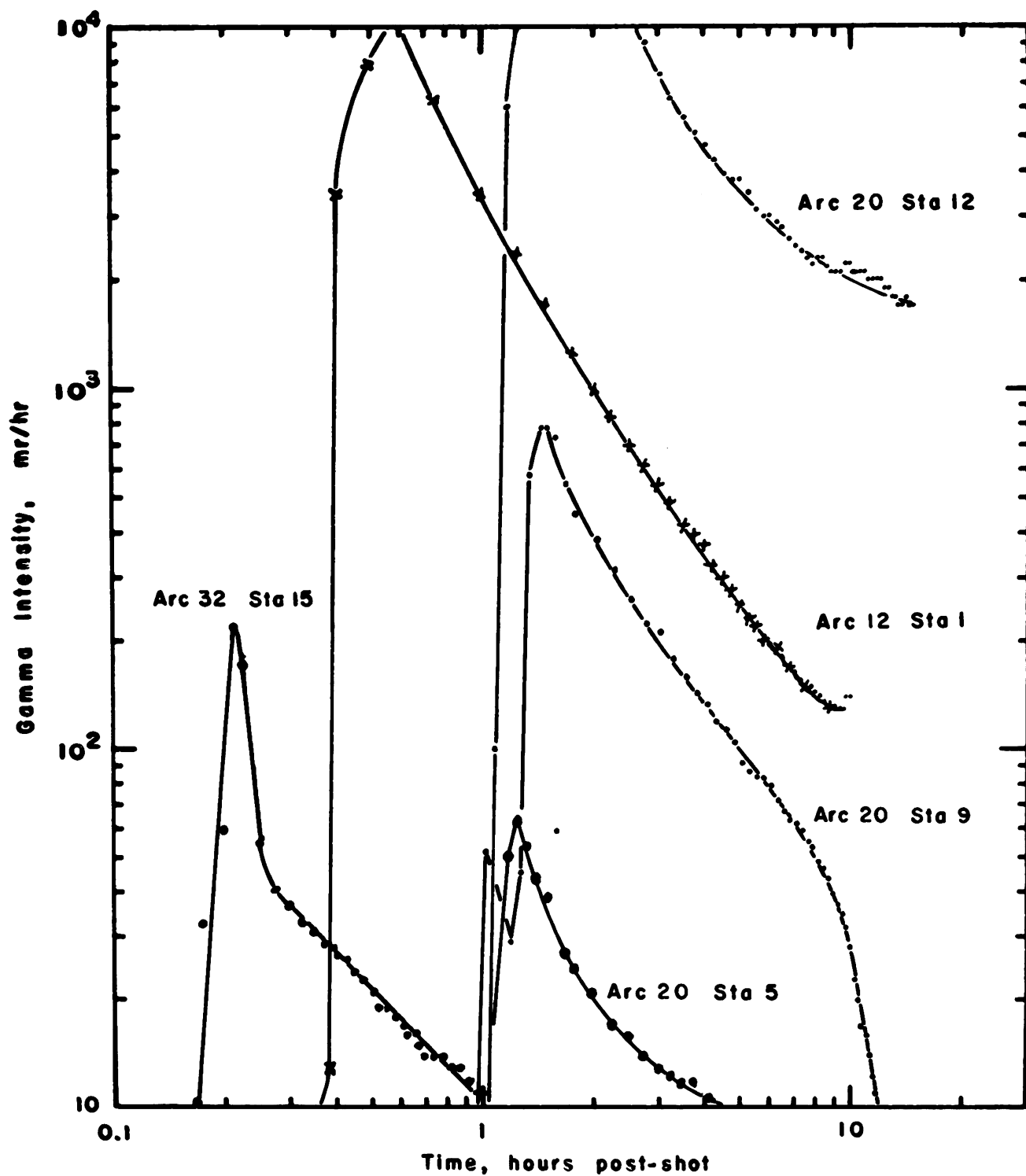
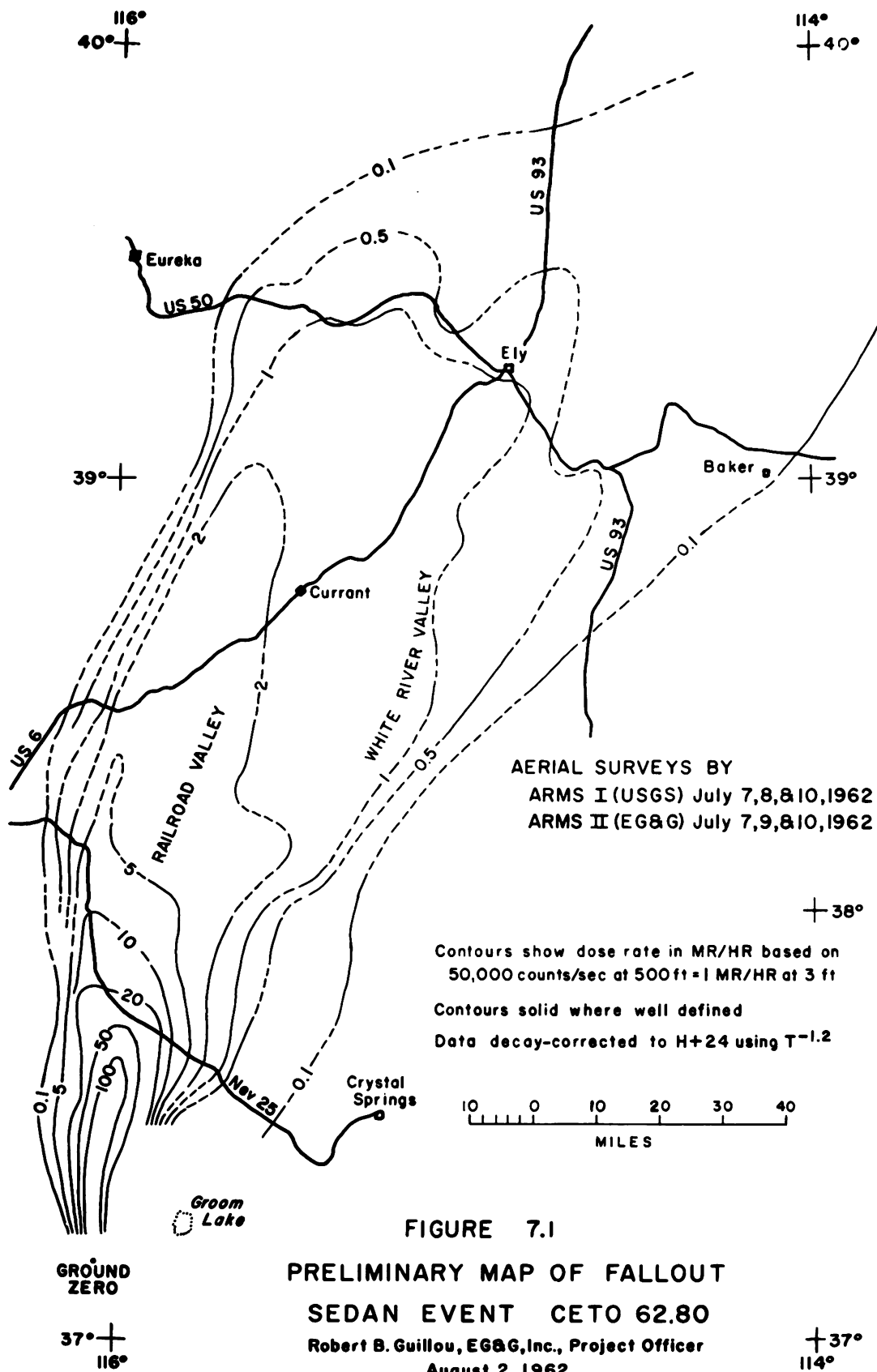


FIGURE 3.2 DECAY CURVES DURING THE FIRST 24 HRS. POST-SHOT
OBTAINED FROM VARIOUS GITR'S, SHOT SEDAN



REFERENCES

1. A. W. Bellamy, et al; "The 1948 Radiological and Biological Survey of Areas in New Mexico Affected by the First Atomic Bomb Detonation"; UCLA-32, November 1949; University of California, Los Angeles, School of Medicine; Atomic Energy Project.
2. K. H. Larson, et al; "The 1949 and 1950 Radiological Soil Survey of Fission Product Contamination and Some Soil-Plant Interrelationships of Areas in New Mexico Affected by the First Atomic Bomb Detonation"; UCLA-140, June 1951; University of California, Los Angeles, School of Medicine, Atomic Energy Project.
3. K. H. Larson, et al; "Field Observations and Preliminary Field Data Obtained by the UCLA Survey Group, Operation Jangle, November 1951"; UCLA-182, January 1952; University of California, Los Angeles, School of Medicine, Atomic Energy Project.
4. J. H. Olafson, et al; "Preliminary Study of Off-Site Air-borne Radioactive Materials, NPG, I. Fallout Originating From Snapper 6, 7 and 8 at Distances of 10 to 50 Miles from Ground Zero"; UCLA-243, February 1953; University of California, Los Angeles, School of Medicine, Atomic Energy Project.

5. C. T. Rainey, et al; "Distribution and Characteristics of Fallout at Distances Greater than 10 Miles from Ground Zero, March and April, 1953"; Project 27, Operation Upshot Knothole, WT-811, February 1954; AEC Technical Information Service Extension, Oak Ridge, Tennessee; Unclassified.

6. H. Nishita and K. H. Larson; "Summary of Certain Trends in Soil-Plant Relationship Studies of the Biological Availability of Fallout Debris"; UCLA-401, July 1957; University of California, Los Angeles, School of Medicine, Atomic Energy Project; Unclassified.

7. L. Baumash, et al; "Distribution and Characteristics of Fallout and Airborne Activity from 10 to 160 Miles from Ground Zero, Spring, 1955"; Project 37.2, Operation Teapot, WT-1178, November 1958; AEC Technical Information Service Extension, Oak Ridge, Tennessee; Unclassified.

8. K. H. Larson, et al; "Summary Statement of Findings Related to the Distribution, Characteristics, and Biological Availability of Fallout Debris Originating from Testing Programs at NTS; UCLA-438, August 1960; University of California, Los Angeles, School of Medicine, Laboratory of Nuclear Medicine and Radiation Biology; Unclassified.

9. P. D. LaRiviere, et al; "Fallout Collection and Gross Sample Analysis"; POIR Project 2.9 - In press.

10. R. G. Lindberg, et al; "The Factors Influencing the Biological Fate and Persistence of Radioactive Fallout"; Project 37.1, Operation Teapot, WT-1177, January 1959; AEC Technical Information Service Extension, Oak Ridge, Tennessee; Unclassified.

11. L. Baumash, et al; "Distribution and Characterization of Fallout and Airborne Activity from 10 to 160 Miles from Ground Zero, Spring 1955; Project 37.2, Operation Teapot, WT-1178, November 1958; AEC Technical Information Service Extension, Oak Ridge, Tennessee; Unclassified.

12. K. H. Larson, et al; "Radioecological Aspects of Nuclear Fallout"; Program 37, Operation Plumbbob, WT-1488; In preparation; Secret Restricted Data.

13. E. M. Romney, et al; "A Granular Collector for Sampling Fallout Debris from Nuclear Detonations"; UCLA-432, January 1959; University of California, Los Angeles, Department and Laboratory of Nuclear Medicine and Radiation Biology; Unclassified.

14. R. W. Farmer and O. Reiner, Jr.; "Determining Arrival Time of Radioactive Fallout"; Electronics, August 1, 1958; Unclassified.

15. F. J. Davis and P. W. Reinhardt; "Instrumentation in Aircraft for Radiation Measurements"; Nuclear Sci. and Eng., 2 (6): 713-727 (1957); Unclassified.

16. R. R. Merian, et al; "Aerial Radiological Monitoring System, Pt 1"; USAEC Report CEX 59.4.1, 1960; AEC Technical Information Service Extension, Oak Ridge, Tennessee; Unclassified.

17. J. E. Hand, et al; "Aerial Radiological Monitoring System, Pt. 2"; USAEC Report CEX 59.4.2, 1962; - In Press.

18. F. J. Davis and P. W. Reinhardt; Personal communication.

TECHNICAL REPORTS SCHEDULED FOR ISSUANCE
BY AGENCIES PARTICIPATING IN PROJECT SEDAN

AEC REPORTS

<u>AGENCY</u>	<u>PNE NO.</u>	<u>SUBJECT OR TITLE</u>
USPHS	200F	Off-Site Radiation Safety
USWB	201F	Analysis of Weather and Surface Radiation Data
SC	202F	Long Range Blast Propagation
REECO	203F	On-Site Rad-Safe
AEC/USBM	204F	Structural Survey of Private Mining Operations
FAA	205F	Airspace Closure
SC	211F	Close-In Air Blast From a Nuclear Event in NTS Desert Alluvium
LRL-N	212P	Scientific Photo
LRL	214P	Fallout Studies
LRL	215F	Structure Response
LRL	216P	Crater Measurements
Boeing	217P	Ejecta Studies
LRL	218P	Radioactive Pellets
USGS	219F	Hydrologic Effects, Distance Coefficients
USGS	221P	Infiltration Rates Pre and Post Shot
UCLA	224P	Influences of a Cratering Device on Close-In Populations of Lizards
UCLA	225P Pt. I and II	Fallout Characteristics

**TECHNICAL REPORTS SCHEDULED FOR ISSUANCE
BY AGENCIES PARTICIPATING IN PROJECT SEDAN**

<u>AGENCY</u>	<u>PNE NO.</u>	<u>SUBJECT OR TITLE</u>
BYU	226P	Close-In Effects of a Subsurface Nuclear Detonation on Small Mammals and Selected Invertabrates
UCLA	228P	Ecological Effects
LRL	231F	Rad-Chem Analysis
LRL	232P	Yield Measurements
EGG	233P	Timing and Firing
WES	234P	Stability of Cratered Slopes
LRL	235F	Seismic Velocity Studies

DOD REPORTS

<u>AGENCY</u>	<u>PNE NO.</u>	<u>SUBJECT OR TITLE</u>
USC-GS	213P	"Seismic Effects From a High Yield Nuclear Cratering Experiment in Desert Alluvium"
NRDL	229P	"Some Radiochemical and Physical Measurements of Debris from an Underground Nuclear Explosion"
NRDL	230P	Naval Aerial Photographic Analysis

ABBREVIATIONS FOR TECHNICAL AGENCIES

STL	Space Technology Laboratories, Inc., Redondo Beach, Calif.
SC	Sandia Corporation, Sandia Base, Albuquerque, New Mexico
USC&GS	U. S. Coast and Geodetic Survey, San Francisco, California
LRL	Lawrence Radiation Laboratory, Livermore, California
LRL-N	Lawrence Radiation Laboratory, Mercury, Nevada
Boeing	The Boeing Company, Aero-Space Division, Seattle 24, Washington
USGS	Geological Survey, Denver, Colorado, Menlo Park, Calif., and Vicksburg, Mississippi
WES	USA Corps of Engineers, Waterways Experiment Station, Jackson, Mississippi
EGG	Edgerton, Germeshausen, and Grier, Inc., Las Vegas, Nevada, Santa Barbara, Calif., and Boston, Massachusetts
BYU	Brigham Young University, Provo, Utah
UCLA	UCLA School of Medicine, Dept. of Biophysics and Nuclear Medicine, Los Angeles, Calif.
NRDL	Naval Radiological Defense Laboratory, Hunters Point, Calif.
USPHS	U. S. Public Health Service, Las Vegas, Nevada
USWB	U. S. Weather Bureau, Las Vegas, Nevada
USBM	U. S. Bureau of Mines, Washington, D. C.
FAA	Federal Aviation Agency, Salt Lake City, Utah
REECO	Reynolds Electrical and Engineering Co., Las Vegas, Nevada

SUPPLEMENTARY DOD DISTRIBUTION FOR PROJECT SEDAN

<u>PNE NO.</u>	<u>DIST. CAT.</u>	<u>PNE NO.</u>	<u>DIST. CAT.</u>	<u>PNE NO.</u>	<u>DIST. CAT.</u>
200	26, 28	214	26	226	42
201	2, 26	215	32	228	42
202	12	216	14	229	26, 22
203	28	217	14	230	100
204	32	218	12, 14	231	22
205	2	219	14	232	4
211	12	221	14	233	2
212	92, 100	224	42	234	14
213	12, 14	225	26	235	14

In addition, one copy of reports 201, 202, 203, 211, 214, 215, 216, 217, 218, 221, 225, 229, 230, 232, 234, and 235 to each of the following:

The Rand Corp.
1700 Main St.,
Santa Monica, California

Attn: Mr. H. Brode

U. of Illinois,
Civil Engineering Hall
Urbana, Illinois

Attn: Dr. N. Newmark

Stanford Research Institute
Menlo Park, California

Attn: Dr. Vaile

E. H. Plesset Associates
1281 Westwood Blvd.,
Los Angeles 24, California

Attn: Mr. M. Peter

Mitre Corp.
Bedford, Massachusetts

General American Transportation Corp.
Mechanics Research Div.
7501 N. Natchez Ave.,
Niles 48, Illinois

Attn: Mr. T. Morrison; Dr. Schiffman

Dr. Whitman
Massachusetts Institute of Technology
Cambridge, Massachusetts